munication by describing his mode of examining delicate anatomical structures :—He procures a hollow sphere of glass, between two and three inches in diameter, of which one fourth is cut off at the open part, and the edges ground so as to fit upon a plate of glass to which the object is attached and immersed in water; the sphere is then filled with water, and inverted over the object upon the plate. The whole being withdrawn from the basin the object may be examined, and the portion of the sphere filled with water furnishes a convenient magnifying power.

A New Method of Solving Numerical Equations of all Orders, by continuous Approximation. By W. G. Horner, *Esq. Communicated by* Davies Gilbert, *Esq. F.R.S.* Read July 1, 1819. [*Phil. Trans.* 1819, *p.* 308.]

The process which the author endeavours to establish in this essay, being the leading theorem in the calculus of derivations, presented under a new aspect, may, he says, be regarded as an universal instrument of calculations, extending to the composition as well as analysis of functions of every kind, but it promises to be especially useful in the numerical solution of equations.

Mr. Horner then proceeds to the illustration of his method, and to explain the investigations to which it is applicable, by details which do not admit of explanation.

An Account of Experiments for Determining the Variation in the Length of the Pendulum Vibrating Seconds, at the principal Stations of the Trigonometrical Survey of Great Britain. By Captain Henry Kater, *F.R.S.* Read June 24, 1819. [*Phil. Trans.* 1819, *p.* 337.]

In this communication Captain Kater, having noticed the circumstances to which his researches owe their origin, proceeds to detail his investigations, and to describe the implements and apparatus employed in his various inquiries; the construction of the pendulum and its appendages is minutely explained, as also the rate of its expansion for each thermometric degree, whence is deduced the corresponding correction to be applied to the number of its vibrations. The operations at each station, with their results, are enumerated at length, and illustrated by numerous tables. The length of the seconds pendulum for the latitude of London is $39\cdot13722$ inches in parts of the scale which forms the basis of the trigonometrical survey; for the latitude of Unst $39\cdot16939$ inches, of Portsay $39\cdot15952$, of Leith Fort $39\cdot15347$, of Clifton $39\cdot14393$, of Arbury Hill $39\cdot14043$, and of Shanklin Farm $39\cdot13407$ inches. The calculation of the latitude of each of these stations is given at length, to afford the opportunity of any further examination desirable on that subject; but these and the other details relating to calculation do not admit of abridgement.

Captain Kater concludes this paper with some observations re-